



The NASA Surface Water Working Group

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Dear Working Group Colleagues,

I would like to update you on the important advances that our NASA Surface Water Working Group (SWWG) has made toward our hydrologic science goals. First and foremost, please know that your participation in the SWWG is critical for our continued success. We have generated a great deal of positive momentum over the short history of our working group and, to continue this success, will require your active participation by attending our meetings, submitting your proposals to NASA, and publishing your results. NASA's Terrestrial Hydrology Program (THP), managed by Jared Entin, continues to fund our SWWG activities as well as making funding opportunities available for our individual research programs. Clearly, we all appreciate the THP.

One of the founding goals for the SWWG is to determine the important surface water science questions that remain unanswered, particularly in the context of the terrestrial branch of the global water cycle. Our *EOS* article presents the general framework of these questions and the reasoning why the answers to these questions require both global and volumetric measurements of hydraulics. Consequently, a spaceborne instrument is most ideally suited for such measurements. As noted in the accomplishments below, this past year the SWWG has helped to initiate the planning for a satellite mission proposal to the Earth System Science Pathfinder (ESSP) program at NASA and the Earth Explorer (EE) program at the European Space Agency (ESA). This mission effort is not funded by the SWWG but has the obvious close scientific, technology, and personnel ties (as explained below). Finally, the SWWG will take new steps in the future to ensure that science questions beyond flow hydraulics and mass balance are included in our agenda, e.g., water quality, sediment transport, and modeling.

Accomplishments:

The following list of bullets, noting our accomplishments during 2004, is assembled in chronological order. Also, this letter is available from our web page (link provided below).

(1) March 22nd & 23rd SWWG Meeting: We met on March 23rd of this year to discuss the technologies that are immediately available for an ESSP submission. This meeting was joint with a meeting of GRACE hydrologists, organized by Jay Famiglietti. Primarily, the technologies need to make measurements of surface water area and elevation. Therefore, three different groups of altimetry experts were invited and presented their thoughts on the potential for measuring surface waters. The groups included David Harding and Bob Schutz (lidar altimetry and GLAS), Keith Raney (delay Doppler radar altimetry), and Ernesto Rodriguez (interferometric radar altimeter). We all sincerely appreciate the time and thoughts of these outstanding scientists as well as their continued involvement in the SWWG. Information regarding this meeting is available on our web page and includes the guidelines that were sent to the technology teams before the meeting, their presentations, and a post-meeting summary.

(2) June 17, 2004, ESSP Technology Selection: As a community, it is important that we understand the process that led to the selection of the JPL interferometric altimeter for the ESSP submission. I sent an email to everyone on June 17, 2004 that detailed the selection process, but it is worth repeating the salient points of that email. David Harding pushed NASA GSFC for lidar altimetry applications to surface waters but GSFC management chose a different direction for lidar. Keith Raney is advocating an excellent idea for understanding ocean bathymetry (ABYSS) through measurements of the ocean surface, however the required orbits for ABYSS differ significantly from surface water. Ernesto Rodriguez has worked with JPL management toward the development of the interferometric altimeter, and given its ability to provide an image of water surface heights, it is an ideal instrument for our needs. Furthermore, Ernesto ensured that our colleagues at the Centre National d'Etudes Spatiales (CNES, the French space agency) were equally interested in our goals. As noted below, the international partnership that has been established by Ernesto's diligence is critical to a successful ESSP-EE submission. Therefore, we are truly pleased to be a part of the JPL-CNES partnership.

(3) June 2004, The THP NEWS NRA: Our working group forms a key role at NASA by facilitating communication between scientists who have keen interests in surface water science and the THP. Because each of you have shared your research interests and concerns at SWWG meetings, Jared and other NASA HQ personnel have a clearer view of our needs. Likewise, Jared is able to inform us of important developments at NASA HQ. This communication is essential, and I believe was important in the language of the NRA, particularly those opportunities for surface water science.

(4) August 12, 2004, OSTP & OMB Memorandum: Although this memo is not an "accomplishment" of the SWWG, it highlights the overall importance of our work. The memo calls for executive departments and federal agencies to focus on our "ability to measure, monitor, and forecast U.S. and global supplies of fresh water" (link to full text is provided below). This memorandum was authored by John Marburger and Joshua Bolten, Directors of the Office of Science and Technology Policy and the Office of Management and Budget (respectively), which when regarding U.S. science, are arguably the two most important office positions in the entire Federal government. The five-page memo is not a "catch-all" urging funding in every science. Rather, Marburger and Bolten are very selective, especially regarding mathematics and physical sciences. They place hydrologic science at the same level of importance as research focused on superconductors, molecular electronics, and novel atomic systems. It is also important to note that they do not mention any other physical sciences. Clearly, the U.S. federal government is keenly interested in research that seeks fundamental understandings of fresh water.

(5) October 6-8, 2004, Joint Meeting of the THP Working Groups: NASA THP includes the Soil Moisture working group and the Cold Land Processes working group. We met in Washington D.C. to discuss the mutual overlaps that could occur between the scientific and technological goals of the working groups. Mutual opportunities discussed included fieldwork, model development, and a potential new groundwater working group.

(6) November 15-16, 2004, CNES Toulouse Meeting: Dennis Lettenmaier, Ernesto Rodriguez, and I joined Nelly Mognard and Anny Cazenave at CNES to discuss the surface water satellite mission. About 25 scientists, mostly from France, attended the Toulouse meeting wherein we agreed to a 50/50 sharing of all mission related science, technologies, and responsibilities. In

brief, we discussed the hydrologic and water management goals of a potential mission and various radar altimetry technologies capable of measuring surface water hydraulics (a more complete summary is available). A core group is now tasked with writing a document detailing the scientific goals and technological requirements of the mission (members include Doug Alsdorf, Paul Bates, Pascal Kosuth, Dennis Lettenmaier, Nelly Mognard, and Ernesto Rodriguez). Everyone is enthusiastic about our international collaborative effort and we look forward to your involvement (see bullet 12 below).

(7) December 13-17, 2004, AGU Meeting: Larry Smith and I hosted a special session at the Fall 2004 AGU entitled “remote observation of surface waters”. The session was well attended by a combined ~30 poster and oral presentations. We plan to continue this session every two years at the Fall AGU. Larry and I are also the new co-chairs of AGU’s Hydrology Remote Sensing Technical committee, thus we very much welcome your suggestions for future AGU sessions. Additionally, Isabella Velicogna and Jay Famiglietti hosted a special session entitled “monitoring the global water cycle from space” which had presentations that fit well with our SWWG goals.

(8) Presentations throughout the year: A number of us continue to make presentations regarding surface water science, remote sensing, and the SWWG. If you would like to make a presentation, then please let me know because I have many Powerpoint slides that you will find useful. Please know that I very much encourage you to make these presentations!

The Future:

The SWWG has goals that reach beyond the upcoming satellite mission proposals. We continue to seek scientific understanding of the biogeochemical, sediment transport, water quality, and water management processes that are inherently tied to global terrestrial surface waters. Likewise, we also support efforts to enhance existing measurement technologies as well as the development of new methodologies. This effort requires your participation, so I hope you will want to be a part of this exciting future.

(9) The National Academies: There are two committees of the National Academies that are discussing over the next ~18 months the science of surface water hydrology and spaceborne measurement technologies (note: the committees have a broader scientific scope but include a surface water component). Links to these committees are provided at the end of this letter. The summaries and directives from these two important committees will prioritize future satellite missions. Clearly, we have a vested interest in these outcomes; thus I will keep you posted.

(10) Job Opportunities! Hydrologic science, and particularly surface water research, offers wonderful job opportunities. I encourage anyone who is interested to review the jobs posted in *EOS*. As part of a SWWG web page update this year, I plan to circulate job ads with you. For now, please note the following from Christa Peters-Lidard: “NASA/GSFC has just reopened a search for several Civil Servant positions, including one in Surface Water/Hydrodynamic modeling and Remote Sensing. A key motivation for this position is to support the proposed mission, and we would appreciate if you could advertise this as widely as possible.” See the links at the end of this letter for more information about the surface water position.

(11) New web page information: Dave Emmitt at Simpson Weather Associates has generously hosted our SWWG web page for a number of years, however, because I recently started a faculty position at the Ohio State University, our web pages are now relocated (see link below). The web pages will undergo a major update to include job postings, recently published articles, and anything else related to our goals! The satellite mission will have a separate web page but cross-linking will be provided. Stay tuned.

(12) The surface water satellite mission: The mission is for everybody and we hope to ensure a role for anyone who wants to be a part of the effort. Unfortunately, there will not be funds available for all of us, but it is clear that being a part of a mission provides researchers with data and collaborations that lead to a greatly improved knowledge of hydrologic processes. Presently, this “inclusionary” approach to the mission is not well defined, so I encourage you to continue your emails with me regarding your thoughts on the optimal organizational structure.

(13) Future science: I would like for our SWWG to more actively expand our scientific interests beyond water mass-balance and hydrodynamics. Issues regarding water quality and water management – even on global scales – are becoming more important. Sediment transport remains a fundamental science goal for many, especially considering the increased efforts toward river and wetland restoration. Hydrologic modeling and remote sensing efforts that connect each of these topics should be a greater focus within the SWWG. During the coming year, I hope to hold a working group meeting to address these issues. Your input is welcomed.

I continue to be enthused with the SWWG and our collective efforts. I hope you also share in this enthusiasm. Please know that I am always happy to correspond with you regarding the working group and the mission.

Sincerely,

A handwritten signature in black ink, appearing to read 'D. Alsdorf' with a stylized flourish at the end.

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Links:

Link to National Academies “Hydrology from Space” committee:
<http://www4.nas.edu/webcr.nsf/ProjectScopeDisplay/WSTB-U-04-03-A?OpenDocument>

Link to National Academies “Decadal Survey” for NASA and NOAA committee:
<http://qp.nas.edu/decadalsurvey>

Link to OSTP & OMB memo:
<http://www.whitehouse.gov/omb/memoranda/fy04/m04-23.pdf>

Link to ESA's satellite mission opportunities:

<http://www.esa.int/export/esaLP/earthexplorers.html>

Link to NASA's ESSP satellite mission opportunities:

<http://centauri.larc.nasa.gov/essp/>

Link to NASA GSFC's surface water job:

http://neptune.gsfc.nasa.gov/aboutus/jobs_detail.php?id=12

The following link lists all positions at NASA GSFC:

<http://neptune.gsfc.nasa.gov/aboutus/jobs.php>

Link to our new SWWG location:

<http://www.geology.ohio-state.edu/swwg>